

WHAT IS CLAIMED IS:

- ✓ 1. A liquid crystal display device, comprising:
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- a liquid crystal display element including: a pair of light-transmitting substrates each including a transparent electrode layer and an alignment layer on the surface thereof facing the other; and a liquid crystal layer sandwiched by the light-transmitting substrates and constituted by a liquid crystal material of which the refractive index anisotropy is specified to vary with wavelengths of rays of light within a range that allows no viewing-angle dependent coloration to occur on a liquid crystal screen;
- a pair of polarizers disposed so as to sandwich the liquid crystal display element; and
- at least one phase difference plate disposed between the liquid crystal display element and the pair of polarizers,
- wherein the phase difference plate has three principal refractive indices n_a , n_b , and n_c being mutually related by the inequality $n_a < n_b < n_c$, and the principal refractive index n_b inclines to the normal to a surface of the phase difference plate.

2. The liquid crystal display device as defined in

claim 1,

wherein the refractive index anisotropy $\Delta n(550)$ of the liquid crystal material for rays of light having the wavelength of 550 nm is specified to be more than 0.060 and less than 0.120.

3. The liquid crystal display device as defined in claim 2,

wherein the refractive index anisotropy $\Delta n(550)$ is specified to be not less than 0.065 and not more than 0.115.

4. The liquid crystal display device as defined in claim 3,

wherein the refractive index anisotropy $\Delta n(550)$ is specified to be not less than 0.070 and not more than 0.095.

5. The liquid crystal display device as defined in claim 1,

wherein the inclination angle of the principal refractive index n_b of the phase difference plate is specified to be in a range from 15° to 75° .

6. The liquid crystal display device as defined in

claim 1,

wherein $\Delta n(450) - \Delta n(650)$, i.e. the difference between the refractive index anisotropy $\Delta n(450)$ of the liquid crystal material for rays of light having the wavelength of 450 nm and the refractive index anisotropy $\Delta n(650)$ thereof for rays of light having the wavelength of 650 nm, is specified to be not less than 0.0070 and not more than 0.0250.

7. The liquid crystal display device as defined in claim 6,

wherein $\Delta n(450) - \Delta n(650)$ is specified to be not less than 0.0200 and not more than 0.0250.

8. The liquid crystal display device as defined in claim 6,

wherein the inclination angle of the principal refractive index n_b of the phase difference plate is specified to be in a range from 15° to 75° .

9. The liquid crystal display device as defined in claim 6,

wherein the refractive index anisotropy $\Delta n(550)$ of the liquid crystal material for rays of light having the wavelength of 550 nm is specified to be larger than 0.060

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and smaller than 0.120.

10. The liquid crystal display device as defined in claim 9,

wherein the refractive index anisotropy $\Delta n(550)$ is specified to be not less than 0.065 and not more than 0.115.

11. The liquid crystal display device as defined in claim 10,

wherein the refractive index anisotropy $\Delta n(550)$ is specified to be not less than 0.070 and not more than 0.095.

12. The liquid crystal display device as defined in claim 9,

wherein the inclination angle of the principal refractive index n_b of the phase difference plate is specified to be in a range from 15° to 75° .

13. The liquid crystal display device as defined in claim 12,

wherein the optical phase difference plate includes:
a support base composed of a transparent organic high polymer; and

a liquid crystal polymer layer formed on the support base to be aligned to possess oblique orientation and crosslinked.

14. The liquid crystal display device as defined in claim 12,

wherein the optical phase difference plate includes:

a support base composed of a transparent organic high polymer; and

a liquid crystal polymer layer formed on the support base to be aligned to possess hybrid orientation and crosslinked.

15. A liquid crystal display device, comprising:

a liquid crystal display element including: a pair of light-transmitting substrates each including a transparent electrode layer and an alignment layer on the surface thereof facing the other; and a liquid crystal layer sandwiched by the light-transmitting substrates and constituted by a liquid crystal material of which the refractive index anisotropy is specified to vary with wavelengths of rays of light within a range that allows no viewing-angle dependent coloration to occur on a liquid crystal screen;

a pair of polarizers disposed so as to sandwich the

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~~liquid crystal display element; and~~

at least one phase difference plate disposed between the liquid crystal display element and the pair of polarizers,

wherein the phase difference plate has three principal refractive indices n_a , n_b , and n_c being such that $n_a = n_c > n_b$, and the principal refractive indices n_a and n_c being parallel to the surface of the phase difference plate, the principal refractive index n_b being parallel to the normal to the surface.

16. The liquid crystal display device as defined in claim 15,

wherein $(n_a - n_b) \times d$, i.e. the product of the difference between the principal refractive indices n_a and n_b multiplied by the thickness d of the phase difference plate, is specified to be in a range from 80 nm to 250 nm.

17. The liquid crystal display device as defined in claim 15,

wherein the refractive index anisotropy $\Delta n(550)$ of the liquid crystal material in the liquid crystal layer for rays of light having the wavelength of 550 nm is specified to be more than 0.060 and less than 0.120.

18. The liquid crystal display device as defined in claim 17,

wherein the refractive index anisotropy $\Delta n(550)$ is specified to be not less than 0.065 and not more than 0.115.

19. The liquid crystal display device as defined in claim 18,

wherein the refractive index anisotropy $\Delta n(550)$ is specified to be not less than 0.070 and not more than 0.095.

20. The liquid crystal display device as defined in claim 17,

wherein $(n_a - n_b) \times d$, i.e. the product of the difference between the principal refractive indices n_a and n_b multiplied by the thickness d of the phase difference plate, is specified to be in a range from 80 nm to 250 nm.

21. The liquid crystal display device as defined in claim 15,

wherein $\Delta n(450) - \Delta n(650)$, i.e. the difference between the refractive index anisotropy $\Delta n(450)$ of the liquid crystal material for rays of light having the

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wavelength of 450 nm and the refractive index anisotropy $\Delta n(650)$ thereof for rays of light having the wavelength of 650 nm, is specified to be not less than 0 and less than 0.0090.

22. The liquid crystal display device as defined in claim 21,

wherein $\Delta n(450) - \Delta n(650)$ is specified to be not less than 0 and not more than 0.0045.

23. The liquid crystal display device as defined in claim 21,

wherein $(n_a - n_b) \times d$, i.e. the product of the difference between the principal refractive indices n_a and n_b multiplied by the thickness d of the phase difference plate, is specified to be in a range from 80 nm to 250 nm.

24. The liquid crystal display device as defined in claim 21,

wherein the refractive index anisotropy $\Delta n(550)$ of the liquid crystal material in the liquid crystal layer for rays of light having the wavelength of 550 nm is specified to be more than 0.060 and less than 0.120.

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wherein the optical phase difference plate includes:
a support base composed of a transparent organic
high polymer; and

a discotic liquid crystal layer formed on the support base to be aligned to possess horizontal orientation and crosslinked.

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